manner to the way in which opal forms. Uranium-rich inclusions are common in other minerals, micas for example. In those micas which have been affected by groundwater, these seem to have formed when uranium from the groundwater precipitated on, or with, grains of opaque minerals, oxides or organic material in the mica. Micas from the interior of unaltered rocks also frequently contain uranium-rich inclusions around which the well-known pleochroic haloes are sometime seen. These may be the usual accessory minerals which form with the major minerals. However, I have noticed that they seem to be more common in micas from meta-sediments than in micas from igneous rocks. I suspect that this may be because, in the original sediments, the uranium was already in the form of detrital grains and any that precipitated from the sea water may have done so on grains of $Fe(HO)_3$, MnO_2, or clays. Apparently, in this respect at least, there is a great difference between the environment in which marine sediments form and that in which opal forms.

Although I have not succeeded in dating this opal, the results have not been as negative as might have been anticipated. It has been shown that opal contains concentrations of uranium which would make fission track dating possible, and even simple, if other factors were favourable, and this uranium is not associated with inclusions. Since this is so for these opals, it is probably so for opals in general, and for other hydrous-silica mineraloids. (Quartz, on the other hand, has uranium concentrations so low that it could not be dated by the fission track method even if its age were similar to that of the earth.) This considerably raises the chances that, among the great variety of these mineraloids, some will prove to be datable. One should look for types in which the grain boundaries are not prominent under the microscope at powers of $\sim$ 400X, and do not become so on etching with hydrofluoric acid.

Explanation of Plate 31

Upper—Features which are believed to be fission tracks in neutron-irradiated, etched Opal No. 4.

Lower—Etched fission tracks in the Lexan overlay of Opal No. 4, showing uranium-rich bands in uranium-free matrix.